FINAL PROJECT

VARIATION EFFECT OF FIBER COMPOSITION AND DIRECTION TOWARD COMPOSITE MECHANICAL PROPERTIES, FIBERGLASS FIBER WITH POLISTER MATRIX MATERIAL

Submitted as a Partial Fulfillment of the Requirements for Getting Bachelor Degree of Engineering in Automotive Department

Arranged by:
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MECHANICAL ENGINEERING DEPARTMENT
INTERNATIONAL PROGRAM
IN AUTOMOTIVE/MOTORCYCLE ENGINEERING
MUHAMMADIYAH UNIVERSITY OF SURAKARTA
October 2014

DECLARATION OF RESEACH AUTHENTICITY

I assert verily that the research entitles.

VARIATION EFFECT OF FIBER COMPOSITION AND DIRECTION TOWARD COMPOSITE MECANICHAL PROPERTIES, FIBERGLASS FIBER WITH POLISTER MATRIX MATERIAL

That made to fulfill some of requirement to get Bachelor Degree of Engineering in Automotive Department of Muhammadiyah University of Surakarta, as far I know is not a plagiarism of research that has been published, except the information source that to solve the problem.

Surakarta, October 2014

Researcher,

Roberto Agus Mainaki

APPROVAL

The final project entitles **"Variation Effect of Fiber Composition and Direction Toward Composite Mecanichal Properties, Fiberglass Fiber with Polister Matrix Material"**, has been approved by supervisor and authorized by Director of International Program as partial fulfillment of the requirements for getting the Bachelor Degree of Engineering in Automotive Department of Muhammadiyah University of Surakarta.

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Day : Thursday

Date : 23 October 2014

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VALIDATION

The Final Project entitles "**Variation Effect of Fiber Composition and Direction Toward Composite Mecanichal Properties, Fiberglass Fiber with Polister Matrix Material**" has been approved by supervisors and authorized by Secretary of International Program as partial fulfillment of the requirements for getting the Bachelor Degree of Engineering in Automotive Department of Muhammadiyah University of Surakarta.

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Head of Department,

(Tri Widodo Besar R., M. Sc. Ph.D.)

MOTTO

Success is not measured by wealth, success is an achievement that we want.

To get a success, your courage must be greater than your fear.

Do whatever you like, be consistent, and success will come naturally.

Intelligence is not the determinant of success, but hard work is the real determinant of your success.

Wise man talks because they have something to say. Fool man talks because they have to say something.

If you cannot be a smart person, so be a good person.

"Verily, never will Allah change the condition of a people until they change it (their state of goodness)" (QS. Ar-Ra'du: 11)

"Nay, seek (Allah's) help with patient perseverance and prayer: It is indeed hard, except to those who bring a lowly spirit" (QS. Al-Baqarah: 45)

DEDICATION

This Research paper is dedicated to:

Allah SWT,

Thanks for the best everything that you have given for me and thanks for you love that always make me to never give up to do the best. I believe that you will always give me the best for everything.

My beloved Mom (Rumiatun) and Dad (Sukaji Mustofa),

Thanks for you prayer, love, support and affection.

You always give me happiness but often I made you disappointed.

I am sorry and I promise to give you the best the future.

My Sister (Siti Rojana Dwi Novista Sari)

Thanks for you support.

It is make strong to get something more and more.

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Thanks for you love, support, attention, spirit and advice.

All my friends (Automotive Engineering “2010”, etc)

Thanks for support and love me.

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The writer realizes that this research paper is far from being perfect, so the writer sincerely welcomes any constructive comment, criticism, and suggestion.

Wassalamu 'alaikum Wr. Wb.

Surakarta, October 2014

The Writer

Roberto Agus mainaki

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LIST OF SYMBOL

W_1 = Activated Energy (J)

W_2 = Absorbed Energy (J)

λ = Arm length (m)

α = Beginning angle

β = Ending angle

K = Impact value (j/mm^2)

A = Cross sectional area (mm^2)

σ_b = Bending Stress (MPa)

P = Max Load (N)

L = Distance between supporter (mm)

b = Width (mm)

d = Thick (mm)

P = Load

A_0 = Cross section

E = Modulus elasticity (kg/mm^2)

σ_u = Ultimate Stress (MPa)

ε = Strain (%)

ABSTRACT

With the development of technology, it is found, new technology in modification motorcycle body, so a lot of people utilize composite for making motorcycle body with the performance they want.

It is easy to make body of motorcycle in willingness. There are three materials in the modifications motorcycle body (catalyst, resin and fiberglass). Fiberglass is a light material, and it is very strong. Though the character of its strength rather lowers that carbon fiber and less stiff, the material which is usually fragile, and the standard material is cheaper. Missal strength and weight character of body is also to make more than metal, and it is easy to make with the press. The purpose of the research is to know the strength of different fibers, from random fiber, woven fiber, and one direction fiber.

Testing is done by differentiating three fibers (random fiber, woven fiber, and one direction fiber) with catalyst composite and the same resin. Every fiber tests with impact test that is based ASTM D - 256, bending test based on ASTM D - 790 and tensile test that is based on ASTM D - 638.

The composition of a catalyst 4.76 % of a resin used, and use of composite volume faction 37.1 %. Analysis is done after getting result data of testing. The result from each testing has a different result. Numbers of height of impact test are gotten from one direction fiber 0.82 J/mm^2, flexure stress is gotten from woven fiber 29.89 MPa, tensile strength is gotten from woven fiber 66 MPa, and elastic modulus from woven fiber 142.268 kg/mm2. The strength to hold is a strength and character as tenacity, strength, hardness etc, it can be considered by data which are gotten from the results of the test.

Keywords: catalyst, fiberglass, resin, and impact test, bending test, tension te.